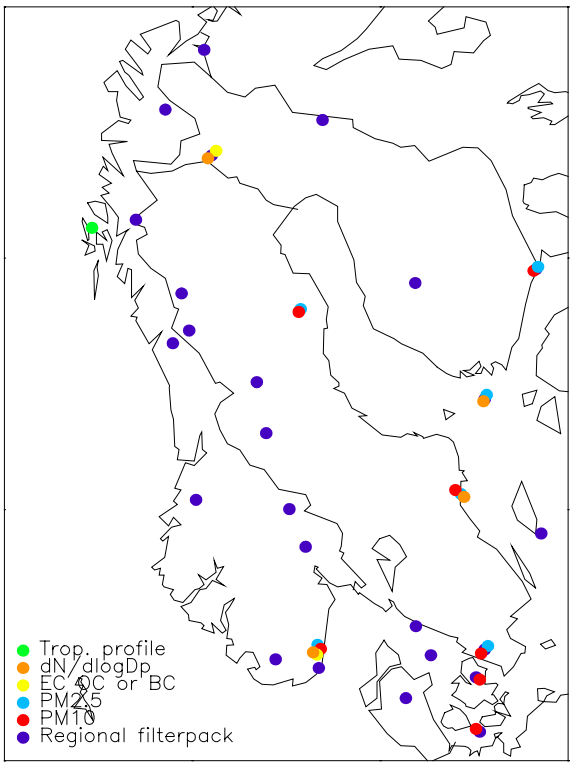
NILU activities related to Particulate Matter

- Measurements and Database activities (EMEP/CREATE)
- PM from domestic woodburning
- PM from wind blown and traffic induced resuspension
- Nesting of regional and urban scale dispersion models

NILU

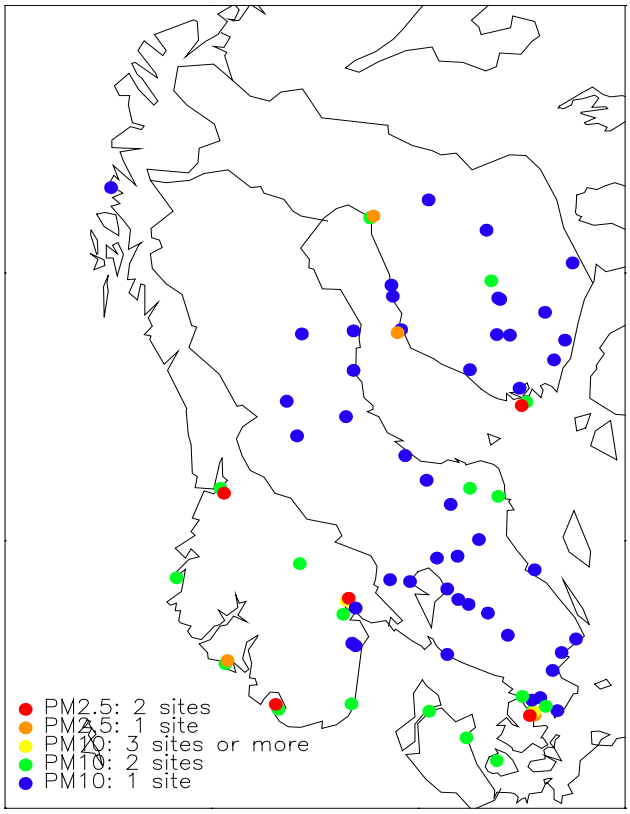
Country	EMEP		National	
Denmark	FP:	4	PM_{10}	1
	PM_{10}	1		
Finland	FP:	5	Optical depth	1
	PM_{10}	1		
	$PM_{2.5}$	2		
	dN/dlogDp	2		
	Optical depth	1		
	BC:	1		
Sweden	FP:	4	FP:	4
	BC:	4	PM_{10}	3
			$PM_{2.5}$	3
			EC/OC	1
Norway	FP:	7	FP:	2
	PM_{10}	1	Trop.	
	$PM_{2.5}$	1	profile:	1
	EC/OC	1	dN/	
	dN/dlogDp	1	dlogDp	1
	Optical depth	1	BC:	1

Regional sites measuring particles



NILU

Urban sites measuring particles



Country	EU Directive	
Denmark	$PM_{2.5}$:	3
	PM_{10}	9
	dN/dlogDp	3
Finland	PM_{10}	22
	$PM_{2.5}$	3
Sweden	PM_{10}	35
Norway	PM_{10}	25
	$PM_{2.5}$	9

CREATE

An aerosol database has been established as part of the FP5/GMES project **CREATE** *(Construction, use and delivery of an European aerosol database),* which started in January 2002 and will continue until December 2004.

The project consortium contributing to the compilation of European aerosol data comprises eleven partner institutions from eight European countries. The database is located at and maintained by *the Norwegian Institute for Air Research (NILU)* in collaboration with the *World Data Centre for Aerosols* of the *Global Atmospheric Watch* programme (GAW/WDCA).

All data compiled in the CREATE database are freely available.

For more information see: http://www.nilu.no/projects/ccc/create

CREATE

Currently, the database contains aerosol data on TSP, PM10, PM2.5, as well as on aerosol chemical composition including the major inorganic components and various heavy metals. In the course of the CREATE project, the database is planned to be expanded by including more data on

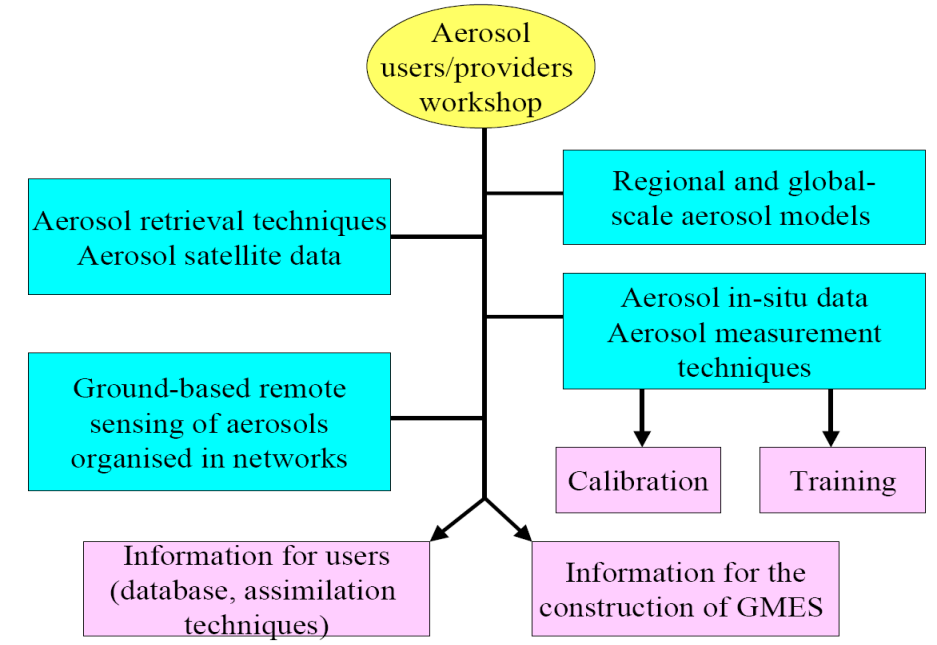
- Total aerosol number concentration
- Aerosol mass concentration (PM10 and PM2.5)
- Aerosol particle size distribution
- Aerosol inorganic composition (nitrate, ammonium, sulphate)
- Mass concentration of organic carbon (OC), black carbon (BC), and total carbon (TC)
- Aerosol radiative data (absorption coefficient, scattering coefficient, aerosol optical depth)
- Mineral dust
- Sea salt

As a major first achievement of the project, a harmonisation of the data flow in **the EMEP network** ⇨ and in **GAW** ⇨ has been attained. More information about the cooperation between EMEP and GAW through the CREATE project and on data formats supported by the CREATE database can be found in the section on **supported data formats** ⇨.

CREATE-DAEDALUS

"Creation and Delivery of an European Aerosol Data Base" and "Aerosol Products for Assimilation and Environmental Use"

Harmonised dataflow between EMEP and GAW has been established



Project on Domestic Woodburning and Particulate Matter

	Phase A	Phase B	Phase C
Measurements	X	X	X
Chemical analysis	Weight and Levoglucosan	Other trace compounds	X
Emissions	X	X	X
Statistical analysis		X	X
Dispersion modelling			X

Phase A: A first estimate of the contribution from domestic wood-burning to the ambient daily concentrations of $PM_{2.5}$ and PM_{10} at the measurement sites, based on weight- and Levoglucosan measurements.

Phase B: Improving the estimate based on a combined use of measurements of additional trace compounds and receptor modelling methods (CMB and PCA). This will also help quantifying the PM contribution from other sources.

Phase C: Applaying the above for validation of the dispersion model.

NILU

Resuspension of PM

- Traffic induced.
- Wind blown.
- Estimating the available depot of particulates (important in spring).

NILU

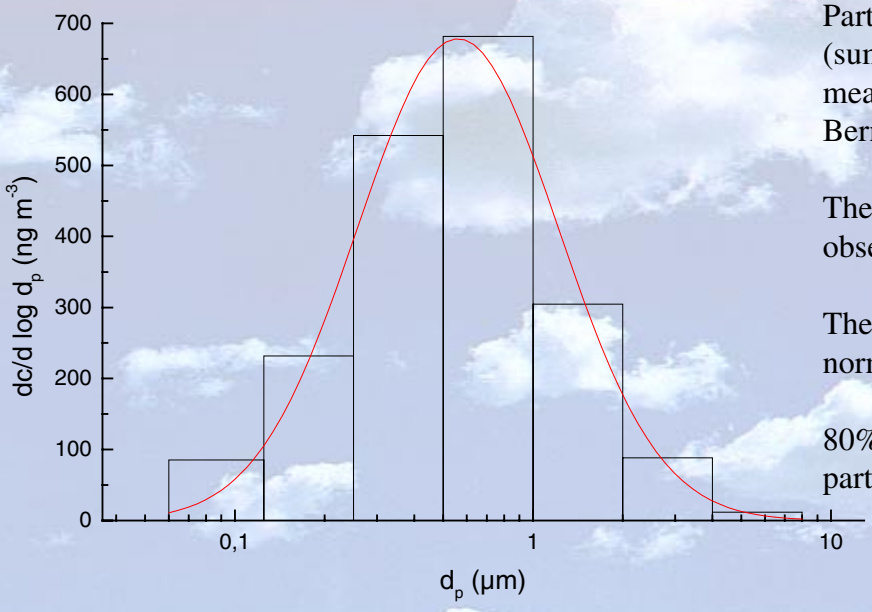
Nesting the Unified EMEP model and the Urban scale model "EPISODE"

- **Ongoing project between met.no and NILU in which nesting capabilities have been implemeted in the models, and coupled photo-oxidant simulations have been performed within the Citydelta project.**

- **The next step is to consider PM (PM_{10} and $PM_{2.5}$) calculations with the coupled model system.**

NILU

Size distribution of PM from woodburning



Particle size distribution of ΣMA (sum of Monosaccharide Anhydrides) measured in ambient air, using a Berner cascade impactor.

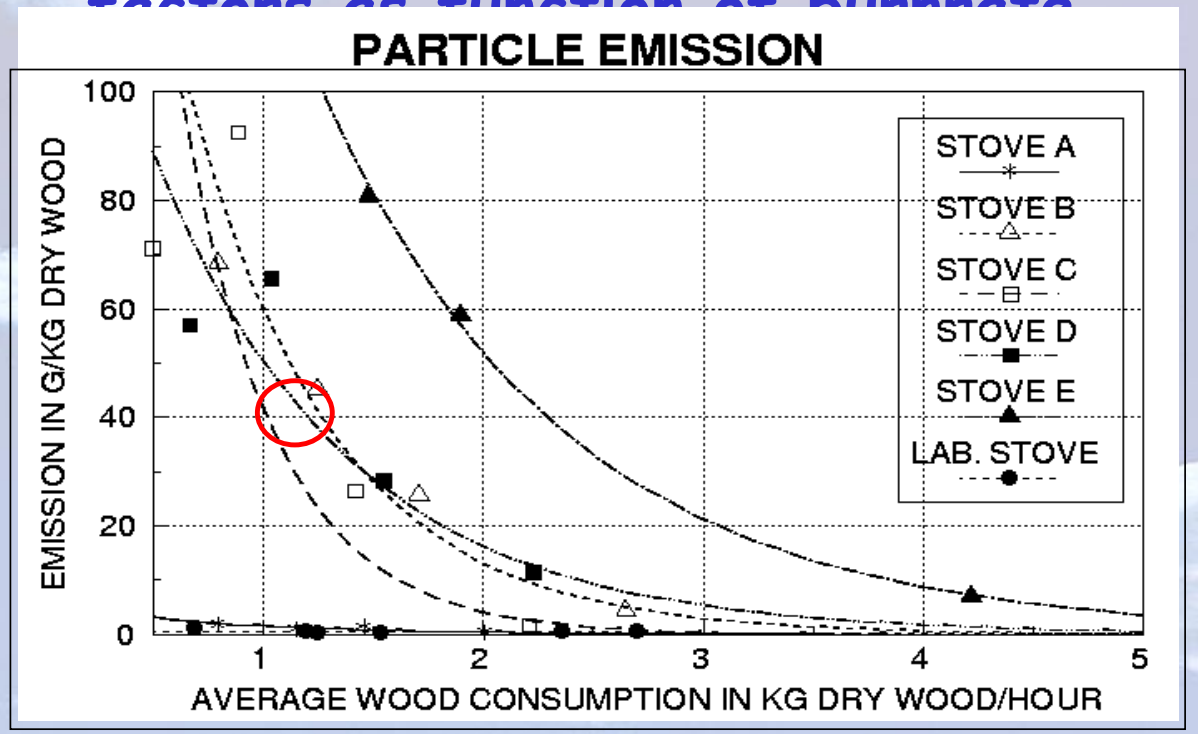
The red line is the lognormal fit to the observed data given in size bins.

The mode diameter (x_c) of the log normal distribution is 561 nm.

80% of the ΣMA is associated with particles < 1 µm.

NILU

Woodburning: Particle emission-factors as function of burnrate

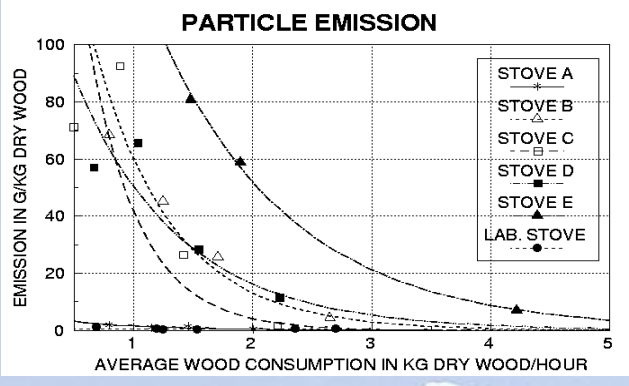


Extracted from SSB-report: Haakonsen & Kvingedal (2001)

Woodburning: Emission factors (g/kg)

Haakonsen and Kvingedal (SSB, 2001)

	Traditional (old) closed ovens	Clean burning (modern) ovens	Open fire-place
PM_{10}	**40**	6,2	17,3



Average emission factor applied for Oslo in 2001:

29 g/kg

(**Assumption:** 1.0 – 1.25 kg dry wood/time)